

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 32

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID R. CORBIN and V.N. MALLIKARJUNA RAO

Appeal No. 1995-4851
Application 08/167,656¹

ON BRIEF

Before WINTERS, WILLIAM F. SMITH, *Administrative Patent Judges*
McKELVEY, *Senior Administrative Patent Judge*
GRON and OWENS, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the examiner's final rejection of

¹ Application for patent filed December 20, 1993.
According to appellants, the application is a continuation of
Application 07/672,875, filed March 20, 1991, now abandoned.

claims 1-20, which are all of the claims in the application.

THE INVENTION

Appellants' claimed invention is directed toward a process for making 2-chloro-1,1,1-trifluoroethane by reacting a 2-chloro-1,1-dihaloethene, where each halo is chloro or fluoro, with hydrogen fluoride in the gaseous phase in the presence of a catalyst which includes a recited amount of zinc on a highly fluorinated alumina support which contains δ -aluminum fluoride. Claim 1 is illustrative and reads as follows:

1. A process for producing 2-chloro-1,1,1-trifluoroethane comprising the step of reacting a trihaloethene of the formula $CX_2=CHCl$ wherein each X is chlorine or fluorine, with HF in the gaseous phase at an elevated temperature in the presence of a supported metal catalyst; wherein said catalyst is a catalyst of metal fluoride on a fluorinated alumina support having an atomic ratio of F to Al of at least 2.7:1 and containing δ -aluminum fluoride; wherein said supported metal includes zinc and optionally includes one or more other metals selected from Groups VIII, VIIB, VIB, IIIB, IIB and IB of the Periodic Table and elements having atomic numbers between 57 and 71; and wherein zinc is at least about 0.1 percent by weight of the catalyst and is at least about 40 percent by weight of the metal on said support.

THE REFERENCES

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| Groppelli et al. (Groppelli) 1974 | 3,793,229 | Feb. 19, |
| Manzer et al. (Manzer) 1988 | 4,766,259 | Aug. 23, |
| Corbin et al. (Corbin) 1994 | 5,321,170 | Jun. 14, |
| Scipioni et al. (Scipioni) 1965 (British patent specification) | 1,000,485 | Aug. 4, |

THE REJECTIONS

Claims 1-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Manzer in view of Groppelli and Scipioni, and also stand rejected under the doctrine of obviousness-type double patenting over claims 1-12 of Corbin in view of Manzer.

OPINION

In parent Application 07/672,875, a rejection under 35 U.S.C. § 103 of the same claims as in the present application over Manzer in view of Groppelli, and a provisional obviousness-type double patenting rejection over the application which issued as the Corbin patent, were affirmed by the board (Appeal No. 93-0865). In its opinion (page 3), the board stated that in the event of further prosecution, a

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more comprehensive body of prior art evidence might include Scipioni. Appellants then filed the present application and, after a first Office action (paper no. 22, mailed February 24, 1994) rejecting the claims further in view of Scipioni, submitted a declaration under 37 CFR § 1.132 by Leo Ernest Manzer (paper no. 24, filed June 24, 1994). The examiner made final the obviousness-type double patenting rejection and the § 103 rejection over Manzer in view of Groppelli and Scipioni (paper no. 25, mailed September 15, 1994), and appellants again appeal.

After carefully considering all of the evidence and arguments of record, we reverse the appealed rejections.

Rejection under 35 U.S.C. § 103

Manzer discloses a process for producing 1,1-difluoro-1,2-dichloroethane and/or 1-fluoro-1,1,2-trichloroethane by reacting a trihaloethylene, CClX=CHCl , and/or a tetrahaloethane, $\text{CCl}_2\text{XCH}_2\text{Cl}$, where X in both formulas is Cl or F, with HF in the gaseous phase in the presence of a catalyst (col. 2, lines 8-16). The catalyst includes a catalytically

effective amount of at least one metal selected from iron, manganese, magnesium and nickel, on a fluorinated alumina support (col. 2, lines 15-24). The metals can be in a many forms including fluorides (col. 2, lines 49-57). The total fluorine content of the catalyst taken as AlF_3 corresponds to at least 90 wt%, preferably at least 95 wt%, exclusive of the metal (i.e., iron, manganese, magnesium and nickel) (col. 2, lines 39-47). The metal content of the catalyst, expressed as the divalent oxide, is not more than 50 wt% (col. 2, line 67 - col. 3, line 1). The process is said to achieve high selectivity of the above products by minimizing the formation of trifluorochloroethane, which is the product recited in appellants' claims, through catalyst selection and control of reaction variables (col. 2, lines 1-5). Regarding control of reaction variables, Manzer states (col. 3, line 62 - col. 4, line 3):

In general, with a given catalyst composition, the higher the temperature, the greater the HF/trihaloethylene and/or tetrahaloethane mol ratio, and the longer the contact time, the greater is the conversion to fluorinated products and the greater is the production of polyfluorinated products. The above variables can be balanced, one against the other, so that formation of $\text{CClF}_2\text{CH}_2\text{Cl}$ and/or

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$\text{CCl}_2\text{FCH}_2\text{Cl}$ is maximized and formation of the more highly fluorinated $\text{CF}_3\text{CH}_2\text{Cl}$ is minimized.

Manzer does not disclose whether the catalyst includes S- aluminum fluoride. However, as indicated by the examiner (answer, page 5), Manzer discloses (col. 3, lines 13-40) a process for making his catalyst which is very similar to the process disclosed by appellants for making their catalyst (specification, page 6, line 32 - page 7, line 30). Appellants do not deny that Manzer's catalyst contains S- aluminum fluoride (brief, page 19).

For the above reasons, we find that the only difference between Manzer's disclosure and the process recited in appellants' claim 1 is that Manzer does not disclose that his catalyst contains zinc.

Groppelli discloses a catalyst for preparing fluorinated or chlorofluorinated hydrocarbons (col. 1, lines 16-17). The catalyst consists essentially of aluminum fluoride containing minor quantities of zinc, chromium, nickel and preferably iron compounds, wherein the zinc is 0.05-5 wt% of the catalyst and the zinc, chromium, nickel and iron compounds are present at least partially in the form of halides, particularly

fluorides, or oxides or oxy-halides (col. 1, line 59 - col. 2, line 7; col. 2, lines 24-30). In run no. 7 in Groppelli's Table 1, the zinc is over 50% of the metal on the catalyst support. In Groppelli's Example 1, the catalyst contains beta-aluminum fluoride and 64.2% fluorine.² Regarding the performance of the catalyst, Groppelli states (col. 1, lines 35-46):

These catalysts are characterized in that they make it possible to form greater quantities of symmetrical compounds or compounds having a relatively higher degree of symmetry as compared with those obtained when using known catalysts. The expression "degree of symmetry" as used herein refers to the distribution of the fluorine atoms and it is also intended that a not entirely symmetrical compound such as

$\text{CF}_2\text{Cl}-\text{CFCl}_2$

has a higher degree of symmetry than the CF_3-CCl_3 isomer.

Groppelli does not disclose production of the product recited in appellants' claim 1.

Scipioni discloses fluorination of trichloroethylene in the gas-phase with HF to produce 1,1,1-trifluoro-2-

²Appellants state in their specification (page 5, lines 13-20) that an atomic ratio of F to Al in the catalyst support of at least 2.7 as recited in their claim 1 corresponds to at least 90 wt% fluorine.

chloroethane (page 1, lines 51-53; page 2, lines 28-35), which is the product recited in appellants' claim 1. Scipioni's catalyst consists essentially of a partially fluorinated alumina activated by impregnation with a solution of one or more polyvalent halides selected from chromium, cobalt, nickel and manganese, wherein the total content of polyvalent metal halide expressed as oxide generally is not more than 15 wt% of the partially fluorinated alumina expressed as alumina (page 3, lines 40-49). Scipioni indicates that "partially fluorinated alumina" is alumina which is 70-80% fluorinated, and teaches that excessive fluorination impairs the activity of the catalyst (page 3, lines 84-87). At one point, Scipioni discusses "impregnating (-alumina with a solution of one or more halides of polyvalent metals *such as* chromium, cobalt, nickel, manganese" (page 3, lines 52-54, emphasis added), but in other portions, he limits the polyvalent metals to chromium, cobalt, nickel and manganese (page 3, lines 44-46 and 71-73). Scipioni does not disclose that the polyvalent metal can be zinc.

The examiner points out that both the Manzer and Groppelli catalysts are gas phase hydrofluorination catalysts which have fluorinated alumina supports and which may contain nickel, and that Manzer discloses that his catalyst can be used to react both a halogenated ethane reactant and a trichloroethylene reactant (answer, page 6). The examiner argues that it is reasonable to assume that Groppelli's catalyst would be useful to react HF with Manzer's trichloroethylene and that one of ordinary skill in the art would have had a reasonable expectation of obtaining a result which is similar to that obtained by Manzer (*see id.*).

In order for a *prima facie* case of obviousness to be established, the teachings from the prior art itself must appear to have suggested the claimed subject matter to one of ordinary skill in the art. *See In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976). The mere fact that the prior art could be modified as proposed by the examiner is not sufficient to establish a *prima facie* case of obviousness. *See In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783

(Fed. Cir. 1992). The examiner must explain why the prior art would have suggested to one of ordinary skill in the art the desirability of the modification. See *id.* at 1266, 23 USPQ2d at 1783-84.

Manzer's desired product is asymmetric with respect to fluorine (col. 2, lines 8-12), whereas GropPELLI teaches that his catalyst produces a compound which is symmetric as to fluorine (col. 1, lines 35-46). In the Manzer declaration (filed June 29, 1994; paper no. 24, page 4), Manzer states that one of ordinary skill in the art would not conclude from GropPELLI's disclosure that GropPELLI's catalyst would be desirable for use in making Manzer's less symmetric compounds. In the declaration (page 5), Manzer points out that GropPELLI's Table 1 shows that including zinc in the catalyst greatly enhances the net yield of the more symmetric $C_2F_4Cl_2$ isomer, CF_2ClCF_2Cl , compared to the less symmetric isomer, CF_3CFCl_2 . The table also shows that when zinc is included in the catalyst, the net yield of asymmetric CF_3CCl_3 is a trace, whereas when the catalyst does not contain zinc, the net yields of that compound are 7.7-26%.

The examiner does not explain, and it is not apparent, why one of ordinary skill in the art, in light of the above-discussed teaching by Gropelli, would have had a "reasonable expectation of obtaining a similar result" (answer, page 6) as that obtained when the Manzer catalyst is used. Instead, it appears that Gropelli would have led one of ordinary skill in the art to expect that Gropelli's catalyst, if used in the Manzer process, would produce symmetrical products rather than the asymmetric compounds desired by Manzer.

The examiner argues that Manzer's teaching, discussed above, wherein reaction variables can be controlled to minimize production of the trifluorochloroethane desired by appellants, would have suggested using closely related catalysts such as that disclosed by Gropelli (answer, page 6). This argument is not convincing. The examiner does not explain why, in view Gropelli's indication that use of zinc in the catalyst causes the product to be symmetric rather than to be asymmetric as desired by Manzer, one of ordinary skill

in the art would have been led by Manzer and Groppelli to use Groppelli's catalyst in Manzer's process of producing asymmetric products.

The examiner further relies (answer, page 6) upon Scipioni for a disclosure of fluorination of trichloroethylene to produce 1,1,1-trifluoro-2-chloroethane (page 1, lines 51-53). However, as pointed out in the Manzer declaration (page 6), Scipioni's catalyst is partially (70-80%) fluorinated (page 3, lines 84-87), and zinc is not among the catalyst components disclosed by Scipioni (col. 3, lines 44-46). The examiner does not explain, and it is not apparent, why the applied references would have fairly suggested, to one of ordinary skill in the art, the use in

Scipioni's catalyst of zinc in combination with Manzer's fluorinated alumina support having a total fluorine content as AlF_3 corresponding to at least 90 wt%.

We find that the motivation relied upon by the examiner for combining the teachings of Manzer, Groppelli and Scipioni

to arrive at appellants' claimed process comes solely from the description of appellants' process in their specification.

Thus, the examiner used impermissible hindsight when rejecting the claims. See *W.L. Gore & Associates v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984); *In re Rothermel*, 276 F.2d 393, 396, 125 USPQ 328, 331 (CCPA 1960). Accordingly, we reverse the rejection under 35 U.S.C. § 103.

Obviousness-type double patenting rejection

Claim 1 of Corbin reads as follows:

1. A process for producing 1,1,1,2-tetrafluoroethane comprising the step of reacting a tetrahaloethane of the formula CH_2ClCX_3 or the formula $\text{CH}_2\text{XCCLX}_2$ wherein each X is chlorine or fluorine, with HF in the gaseous phase at an elevated temperature in the presence of a supported metal catalyst; wherein said catalyst is a catalyst of metal fluoride on a fluorinated alumina support having an atomic ratio of F to Al of at least 2.7:1 and containing S -aluminum fluoride; wherein said supported metal includes zinc and optionally includes one or more other metal selected from Group VIII, VII, VIIB, VIB, IIIB, IIB and IB

of the Periodic Table and elements having atomic numbers between 57 and 71; and wherein zinc is at least about 0.1 percent by weight of the catalyst and is at least 40 percent by weight of the metal on said support.

The examiner argues that appellants' claims and those of Corbin "differ only in the starting materials used" (answer, page 3). As pointed out by appellants (brief, page 29), the examiner is incorrect. The product made by Corbin's process, 1,1,1,2-tetrafluoroethane, is a hydrofluorocarbon, and differs from the hydrochlorofluorocarbon, 2-chloro-1,1,1-trifluoroethane, made by appellants' process.

The examiner argues that Manzer discloses the equivalence of various saturated and unsaturated starting materials in a process which is similar to that of Corbin (answer, page 3).

Manzer

teaches that his starting material can be a trihaloethene, $\text{CCl}_x\text{=CHCl}$, and/or a tetrahaloethane, $\text{CCl}_2\text{XCH}_2\text{Cl}$, where, in both formulas, X is Cl or F. The formula for Manzer's trihaloethene includes $\text{CCl}_2\text{=CHCl}$ and CClF=CHCl , which can be appellants' starting materials. Manzer's tetrahaloethane includes $\text{CH}_2\text{ClCCl}_3$ and $\text{CH}_2\text{ClCCl}_2\text{F}$, which fall within the formulas for Corbin's tetrahaloethane starting materials, i.e., CH_2ClCX_3 and $\text{CH}_2\text{XCclX}_2$, where, in both formulas, X is Cl or F. The examiner's argument apparently is that given the

teaching that either trihaloethenes or tetrahaloethanes can be used as starting materials in Manzer's process wherein the catalyst contains no zinc, one of ordinary skill in the art would have reasonably expected that using Manzer's trihaloethenes instead of Corbin's tetrahaloethanes in Corbin's process wherein the catalyst contains zinc would still produce Manzer's disclosed products which include, as an undesired product, appellants' trifluorochloroethane. This argument is not well taken because the examiner has provided no supporting evidence or technical reasoning. As discussed above, the tetrahaloethane starting material used in Corbin's claimed process can include tetrahaloethane starting materials used by Manzer. The product made by Corbin's process, however, is 1,1,1,2-tetrafluoroethane, which is not a product which Manzer discloses is made from a tetrahaloethane starting material by his process. Thus, it is not apparent that if Manzer's trihaloethene materials were used in Corbin's process, the products disclosed by Manzer, including the undesired trifluorochloroethane made by appellants' process, would be

produced.

The examiner argues that appellants' starting materials are analogous to those of Manzer, and that in view of Manzer, one of ordinary skill in the art would have been motivated to use appellants' starting materials in Corbin's process because of the reasonable expectation of obtaining known and useful products (answer, page 3). "When the PTO seeks to rely upon a chemical theory, in establishing a prima facie case of obviousness, it must provide evidentiary support for the existence and meaning of that theory. [citation omitted] The known structural relationship between adjacent homologs, for example, supplies a chemical theory upon which a prima facie case of obviousness of a compound may rest." *In re Grose*, 592 F.2d 1161, 1167-68, 201 USPQ 57, 63 (CCPA 1979). The examiner has merely stated that the starting materials are analogous, and has not provided the required evidence that the relied-upon similarity of the starting materials would have led one of ordinary skill in the art to appellants' claimed process. Hence, we do not find the examiner's argument to be convincing.

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For the above reasons, we conclude that the examiner has not carried his burden of establishing a *prima facie* case of obviousness-type double patenting over claims 1-12 of Corbin in view of Manzer. We therefore reverse the obviousness-type double patenting rejection.

Prior board decision

When the examiner's rejection of appellants' claims under 35 U.S.C. § 103 over Manzer in view of GropPELLI, and the provisional rejection of the claims under the judicially created doctrine of obviousness-type double patenting over the claims of the application which issued as the Corbin patent previously were before the board (appeal no. 93-0865), the board apparently relied upon a *per se* rule that appellants' claimed process would have been *prima facie* obvious to one of ordinary skill in the art through control of reaction variables, provided that the prior art discloses a catalyst and starting materials which are similar to those used by appellants. Subsequent to the board's decision, the Federal Circuit stated in *In re Ochiai*, 71 F.3d 1565, 1572, 37 USPQ2d 1127, 1133 (Fed. Cir.

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1995), that "reliance on *per se* rules of obviousness is legally incorrect and must cease." Furthermore, the panel in the previous appeal did not have the benefit of the focus on the evidence provided by the Manzer declaration. For these reasons, we are not bound by the decision of the previous panel.

In the present appeal, we have considered and weighed the entirety of the evidence for and against patentability. We reverse the herein-appealed rejections. Moreover, to the extent that our decision in this case is inconsistent with the decision of the panel in Appeal No. 93-0865, the prior decision is hereby overruled.

DECISION

The rejection of claims 1-20 under 35 U.S.C. § 103 over Manzer in view of Groppelli and Scipioni, and under the doctrine of obviousness-type double patenting over claims 1-12 of Corbin in view of Manzer, are reversed.

REVERSED

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